

Claims (A 19 Amended on 18. 07. 2005)

1. (amended) A laser ionization mass spectrometer comprising pulsed gas ejecting means, a laser beam irradiation system, repeller and extraction electrodes and mass analyzing means characterized in
that said pulsed gas ejecting means is provided with a valve for ejecting carrier gas containing sample molecules into a vacuum chamber in pulse mode,
that said laser beam irradiation system irradiates laser beam to said carrier gas ejected into said vacuum chamber for selective photo reaction of said sample molecules in said carrier gas ejected into said vacuum chamber,
that said repeller and extraction electrodes are arranged within said vacuum chamber and generate an electric field for extracting sample molecules formed by said photo reaction,
that said mass analyzing means analyzes mass of sample molecular ions extracted by said repeller and extraction electrodes,
that a valve of said pulsed gas ejecting means is set so that said pulsed gas has pulse length shorter than a distance from an ejecting position to said laser beam irradiation point to said carrier gas and
a position whereat a leading portion gas (a gas ejected before full opening of said valve) of said pulsed gas translating in said vacuum chamber is overtaken by a faster flat portion gas (a gas ejected during full open of said valve) is obtained and
that said laser beam irradiation system is set near said overtaking position.

2.15. (no change)

16. (amended) A mass spectrometer as claimed in claim 14 or 15 characterized in
that said repeller and extraction electrodes are arranged with a sufficient gap not causing collision with said laser flux generated by the laser beam irradiation system and
that said repeller and extraction electrodes have sufficient confronting surfaces which do not warp an electric field generated between said electrodes.

17. (no change)

18. (added) A mass spectrometer as claimed in claim 1 characterized in that laser beam irradiation positioning means is further provided for determination of laser beam irradiation position to said carrier gas by said laser beam irradiation system prior to analysis of said carrier gas containing said sample molecules,

that said laser beam irradiation positioning means includes pressure measuring means and displaying means,

that said pressure measuring means measures pressure at a cross point of said carrier gas flow ejected by said pulsed gas ejecting means into said vacuum vessel with laser beam irradiated from said laser beam irradiation system,

that said displaying means displays a pressure time waveform of said carrier gas flow detected by said pressure measuring means,

that said pulsed gas ejecting means is able to change its distance with respect to said cross point of said carrier gas flow irradiation to said laser beam within said vacuum vessel and

that said pressure time waveform of said carrier gas can be confirmed by said displaying means as a position whereat said flat-top trapezoidal pressure distribution having a flat portion transitions into said triangular pressure distribution without said flat portion.

19. (added) A laser beam irradiation positioning method to a carrier gas flow prior to mass analysis on a laser ionization mass spectrometer which includes pulsed gas ejecting means, a laser beam irradiation system, repeller and extraction electrodes and mass analyzing means, said pulsed gas ejecting means having a valve for ejecting in pulse mode said carrier gas containing sample molecules into a vacuum chamber, said laser beam irradiation system irradiating laser beam to said carrier gas containing said sample molecules and ejected into said vacuum chamber for selective photo reaction of said sample molecules in said carrier gas ejected into said vacuum chamber, said electrodes being arranged within said vacuum chamber and generating an electric field for extraction of said sample molecular ions generated by said photo reaction and said mass analyzing means analyzing mass of said sample molecular ions extracted by said electrodes

characterized in

that an over-taking position whereat a leading portion gas (a gas ejected prior to full opening of said valve) in said pulsed carrier gas ejected from said pulsed gas ejecting means and translating in said vacuum chamber is overtaken by a faster flat portion gas (a gas ejected during full opening of said valve) is obtained and that said laser beam irradiation point to said carrier gas flow is set near said over-taking position.